

Water Well Program

NH Department of Environmental Services

NH Water Well Board

Two Agencies Working Together
To Protect Groundwater

NH Water Well Board

- A Seven Member Executive Branch Board
 - Members Appointed by the Governor with the Consent and Advice of the Executive Council
 - 2 Water Well Contractors
 - 1 Technical Driller
 - 1 Pump Installer
 - 1 Public Member
 - The NH State Geologist
 - The Commissioner of NHDES or *designee*
- Licensing Authority
- Independent Rulemaking Authority

NH Department of Environmental Services

- Administers the Water Well Program
 - One Full Time Staff
 - Rick Schofield
 - Two Part Time Staff:
 - Chip Mackey
 - Allyson Gourley
- Concurrent Authority to Enforce RSA 482-B and Rules Adopted by the Board

Program Mandates

- Licensing
- Well Construction Standards
- Pump Installation Standards
- Enforcement
- Reporting

Licensing

License Types Issued

- Rotary Drill
- Cable Tool Drill
- Point Well & Wash Well Construction
- Dug Well Construction
- Monitoring Well Const
- Pump Installations:
 - Domestic & Industrial



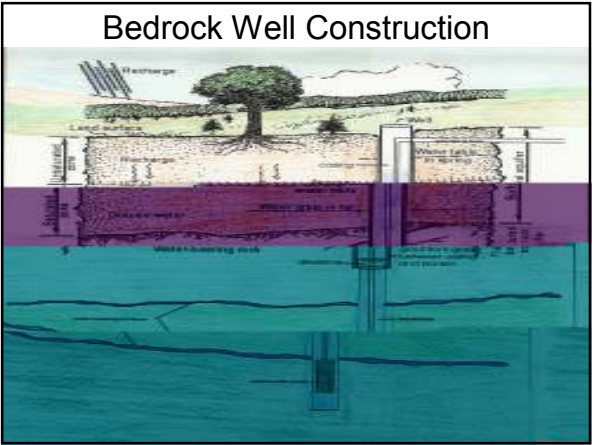
Home Water Supply

Basic Facts a Homeowner Needs to Know

- 1) What Type of Well?
- 2) How Much Water?
- 3) Is the Water Safe to Drink?

Common Well Types & Statistics			
Well Database 110,000 records			
Well Type	% Total Wells		
1) Drilled in Bedrock	97		
2) Constructed in Sand and Gravel	2		
3) Dug Wells Constructed by Excavation	< 1		
	Average Depth [ft]	Deepest Well [ft]	Average Yield [gpm]
Bedrock Wells	358	2120	15
Gravel Wells	83	392	48
Point/Wash Wells	35	120	15
Dug Wells	16	30	45

Wells ranging from 1,000 to 2,000 feet deep!!! 1,419



Air Rotary Drilling



Pneumatic Hammer



Mud Rotary Drilling



Cable Tool Drilling



Setting Casing



Stratified-Drift Aquifer



Gravel Wells



Point Wells



Dug Wells





Yield Test Methods	
	<u>Percent of Wells</u>
Pump Test	2%
Bailed	5%
Compressed Air	92%



Well Yields Domestic Bedrock Wells

Yield Range [gpm]	Percent of Total
Greater than 5	60%
Between 2 and 5	30%
Between 2 and 0.5	9%
Less than 0.5	1%



No State Requirement for Well Yield

Recommended Minimum Capacity

600 Gallons within a 2 Hour Period at Least
Once Per Day

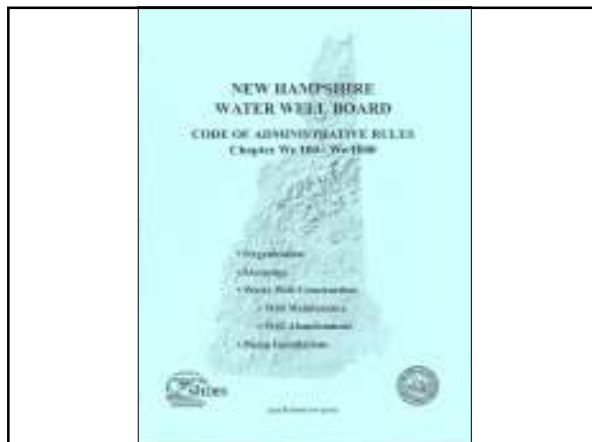
Equal to:

5 Gallons per Minute for 2 Hours

Minimum Capacity Table

Supply 600 Gallons in 2 Hours

Sustained Well Yield [gpm]	Required Well Depth [ft]
0.5	400
1	360
1.5	320
2	280
2.5	240
3	200
3.5	160
4	120
4.5	80
5	---



Setback Requirements for Private Wells

- 75 ft Property Boundaries
 - Exception: Protective radii may overlap onto land that is precluded from development:
 - Roads, Wetlands, Surface Water Bodies, Protected Lands
- 75 ft Septic System Leach Fields
- 75 ft Septic Tanks
 - Exception: May be reduced to 50 ft when tanks are sealed and grouted and sewer pipe is SDR 26 or better
- 50 ft State Highway R-O-W
- Private Wells Exempt from Shoreland Setbacks

Non-Conforming Locations

3% of Wells

- Small Lots / Lake Front Property
- Maximize Setback to Septic Systems
- Extra Casing Required
 - where depth to bedrock less than 20 feet,
 - 40 feet of casing installed into competent bedrock
- Casings Grouted
- Standard Release Form (NHDES)
- Non-conforming Location Form (WWB)

Well Head

- **8 Inches Above Ground**
- **Sealed Cover**
- **Screened Vent**
- **Electrical Conduit Secured to Cover**



Wire Connections & Grounding

- ✓ Submersible pump motors grounded and bonded to well casings.
- ✓ Wire connections must be water tight.
Exception: Grounding conductor
- Wire nuts prohibited



Public Water Supply Wells Grouted

New Rule

- We 602.06(k) Void Area Outside Casing shall be grouted
- Acceptable Grout Materials:
 - Cement
 - Bentonite
 - Cement / Bentonite Grout Mixture
- Acceptable Placement Methods:
 - Tremie Pipe Method
 - Haliburton Method

Hydro-pneumatic Tanks



- We 702.05(o)
Tanks Sized for Minimum Run Time
(Manufacturer Recommended)
- One Minute Run Time Standard
 - ✓ 5gpm pump = 5 gal drawdown
 - ✓ 7gpm pump = 7 gal drawdown
 - ✓ 10gpm pump = 10 gallon drawdown

Non-Compliant Covers

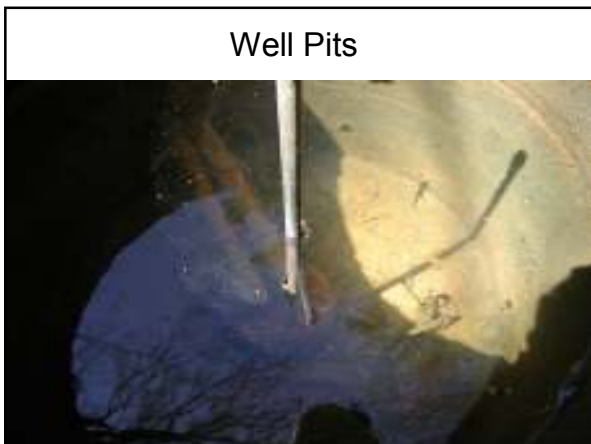




No Cover!



Well Pits



Before



After

- Finished wellhead height at least 8 inches above ground surface.
- Well must be disinfected following re-installation of the pump.



Unconventional Wells



Unconventional Wells
(Unlicensed Contractors)



Well Cover!!!



Geothermal Wells

<u>Year</u>	<u>Wells Reported</u>
2003	4
2004	6
2005	9
2006	30
2007	45
2008	89 and counting

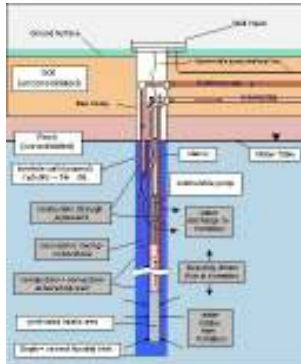


Geothermal Well Types

- Open Loop
 - Standing Column Well Design
 - Withdrawal & Return Well Design
- Closed Loop
- DX (Direct Exchange) Systems

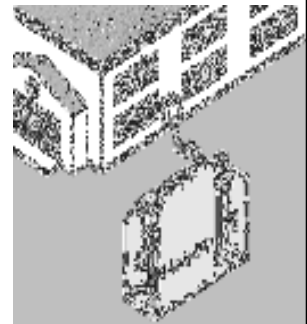
Open Loop Standing Column Well

- Usually 500 feet deep
- Casing Installed 20 ft into competent bedrock
- Casing annulus grouted w/ cement – Bentonite grout mix
- Return water injected below the draw down level
- Register with the Groundwater Recharge Program



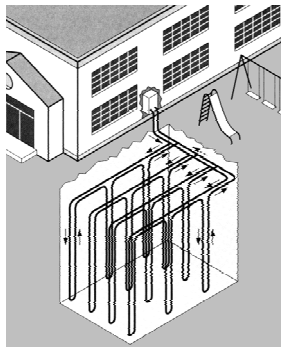
Open Loop Withdrawal and Return Well

- Withdrawn water must be returned to the same aquifer
- Return water injected below the static water level
- Register with the Groundwater Recharge Program



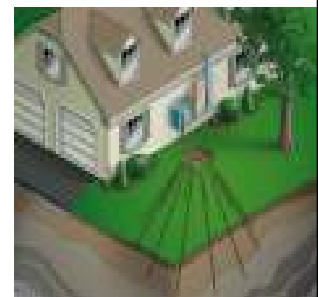
Closed Loop

- 50 foot setback to drinking water wells
- Thermal loop HDPE pipe
- Entire length of borehole grouted
- Approved grout mixtures:
 - ✓ Cement-Sand Grout
 - ✓ Bentonite-Sand Grout
 - ✓ High Solids Bentonite Grout
- Prohibited materials:
 - Sand, gravel, pea-stone, drillings
- Registration



DX Systems

- Small diameter vertical or diagonal 100 ft boreholes
- Thermal loop small diameter copper tubing
- Boreholes grouted
- Corrosion protection
- Geo-exchange fluid circulated directly into the earth – R-22
- Register with the Groundwater Recharge Program



Well Completion Reports

New Reporting Requirements
House Bill 459 Effective December 8, 2007

- Water Well Contractors File Reports Within 90 Days.
- New Location Information Required:
 - (1) GPS Coordinates,
 - (2) 911 Street Address, if assigned
 - (3) Tax Map and Lot Number,
 - (4) A Drawing indicating the position of each well, if more than one well within the lot.

Well Information

Well Construction Details on the Web

<http://des.nh.gov>

Look for A to Z Programs
and scroll to Water Well Board

Or Call

NH Geological Survey at 271-1973

The screenshot shows the 'NHDES Water Well Query' web application. At the top, there is a navigation bar with links: 'DES Home', 'NHDES Well Site Map Program', 'Informational Page', 'Water Wells', and 'Wellboard Maps'. Below this, the title 'NHDES Water Well Query' is displayed. The main content area contains several search filters: 'Town' (dropdown), 'Alternate Town' (dropdown), 'Road' (dropdown), 'Owner Last Name or Company Name' (text input), 'Well Completed Between' (two date dropdowns), 'State Well ID' (dropdown), and 'Other Well ID' (text input). At the bottom of the filters are 'Submit Query' and 'Reset' buttons. A footer note states: 'Database populated and maintained by the NH Geological Survey'.

Decommissioning Abandoned Wells
Tremie Grout Method





